



CPHST Support of the CAPS Program

Daniel A. Fieselmann
USDA-APHIS-PPQ
Center for Plant Health Science and Technology





D. Fieselmann

Sudden Oak Death *Phytophthora ramorum*

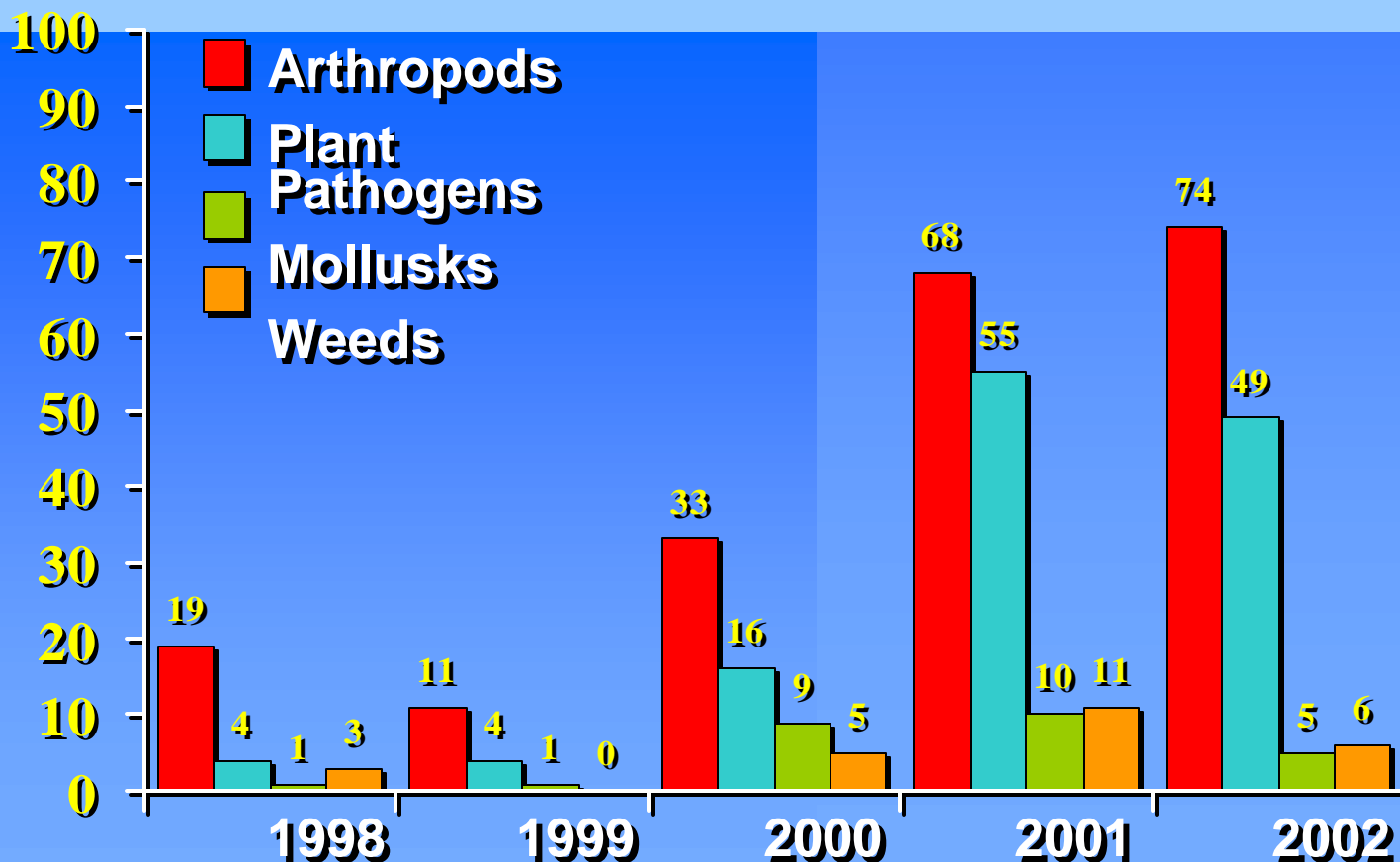






New Pest Advisory Group

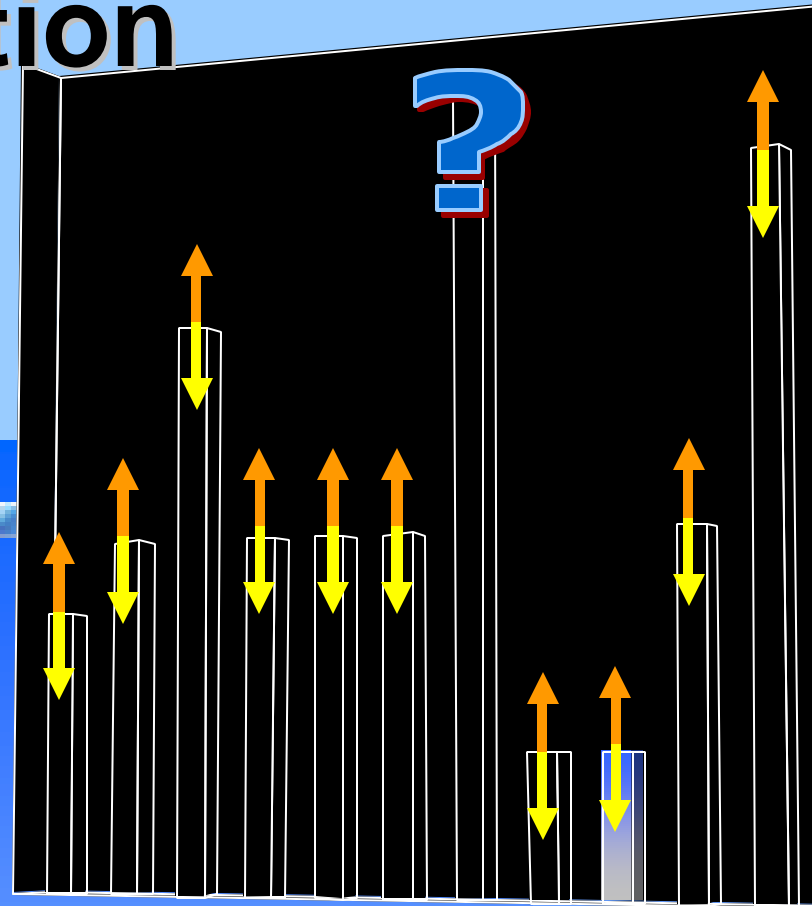
Pests Considered by Year



Plant Protection

Value Added
to
Safeguarding

Newly Established
Pest



Exotic Pest



Pest Management/Biocontrol
Eradication
Pest Detection
Smuggling Interdiction (SITC)
Permits/Regulation
PPQ-AQI
DHS
Predeparture
Preclearance
Offshore Information
Mitigation at Origin

Daniel Fieselmann NSPL

Center for Plant Health Science & Technology

Strategies to Enhance Safeguarding

- New Technology
- Risk Analysis/Management
- Feedback/Integrated Systems
- Pest Lists
- Alternative Funding Sources
- Decision Support
- Spatial Analysis
- Predictive Modeling
- New Talent
- New Partners

- Free Trade
- Bioterrorism

Challenges to Safeguarding

CAPS



**Plant Protection/
Agriculture**

Exports

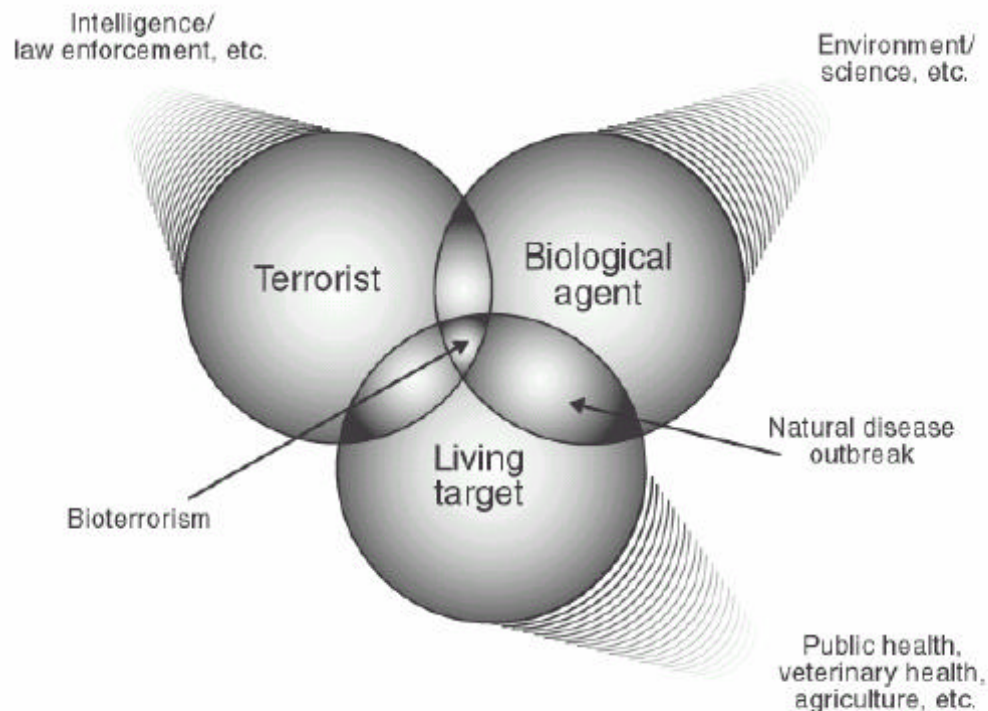
**Biodiversity/
Environmental
Plant
Resources**

Bioterrorism





A “BioEvent” Intersects Stakeholders and Their Responsibilities



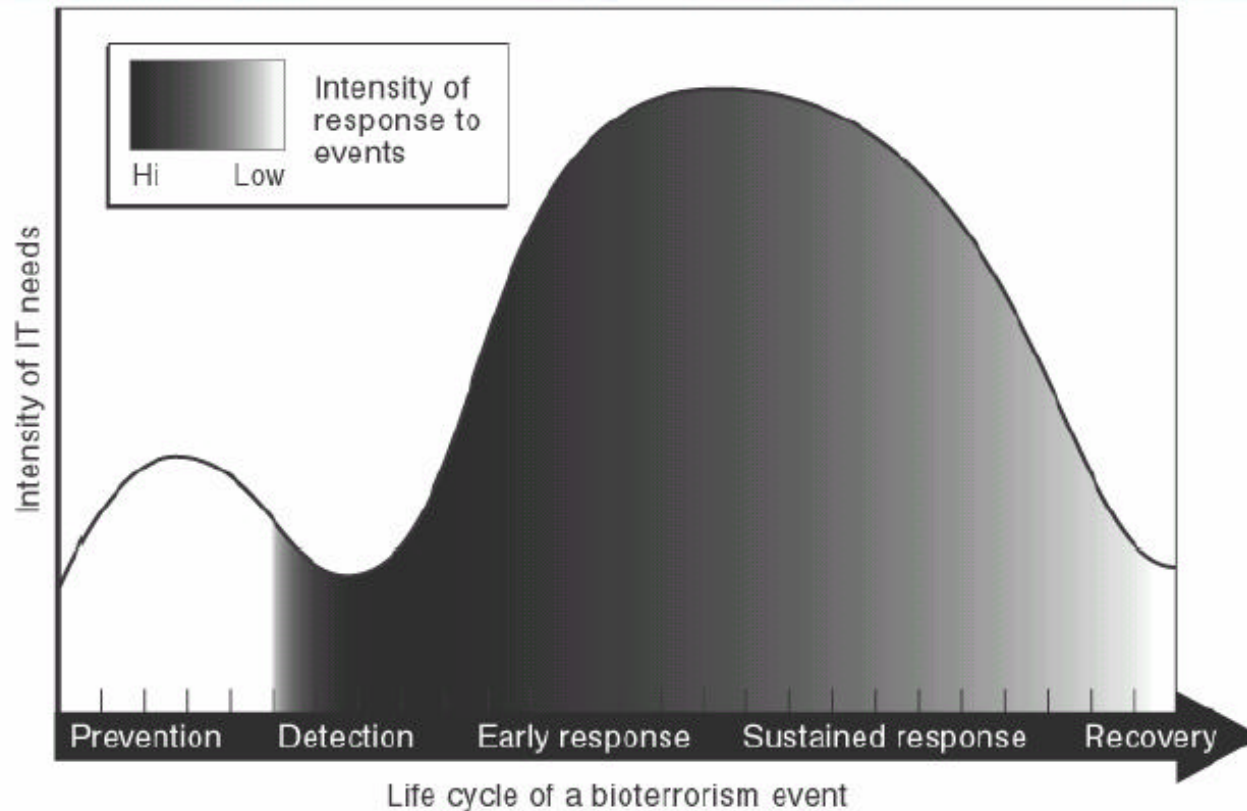
Science and Technology Policy Institute

RAND

4/21/2003

7

The IT Infrastructure Needs to Support Needs Over the Lifecycle of a “BioEvent”



Science and Technology Policy Institute

RAND

4/21/2003

8

Helga E. Rippen, MD, PhD, MPH



A Successful CAPS

Money

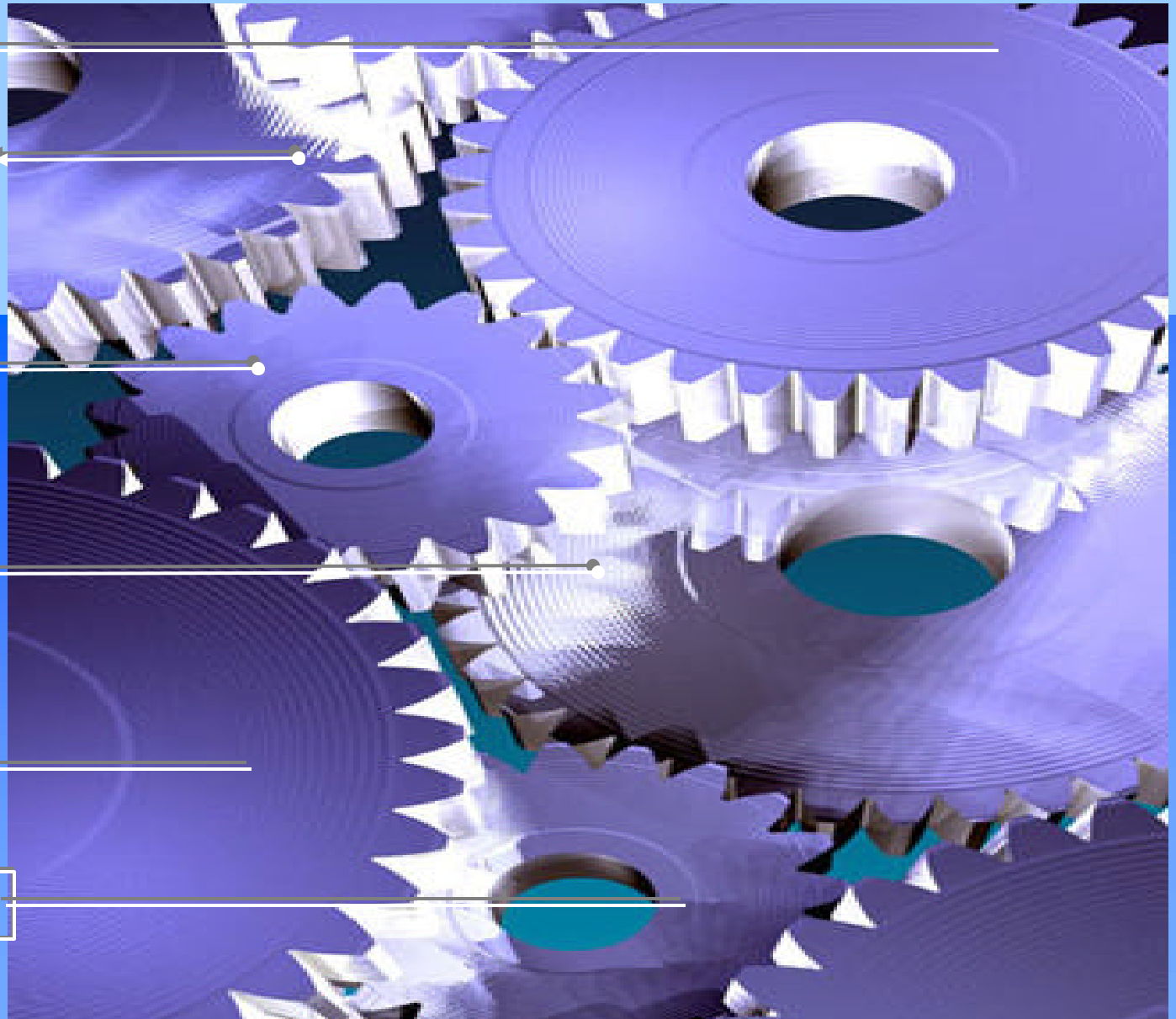
Leadership/
Management

Strategy

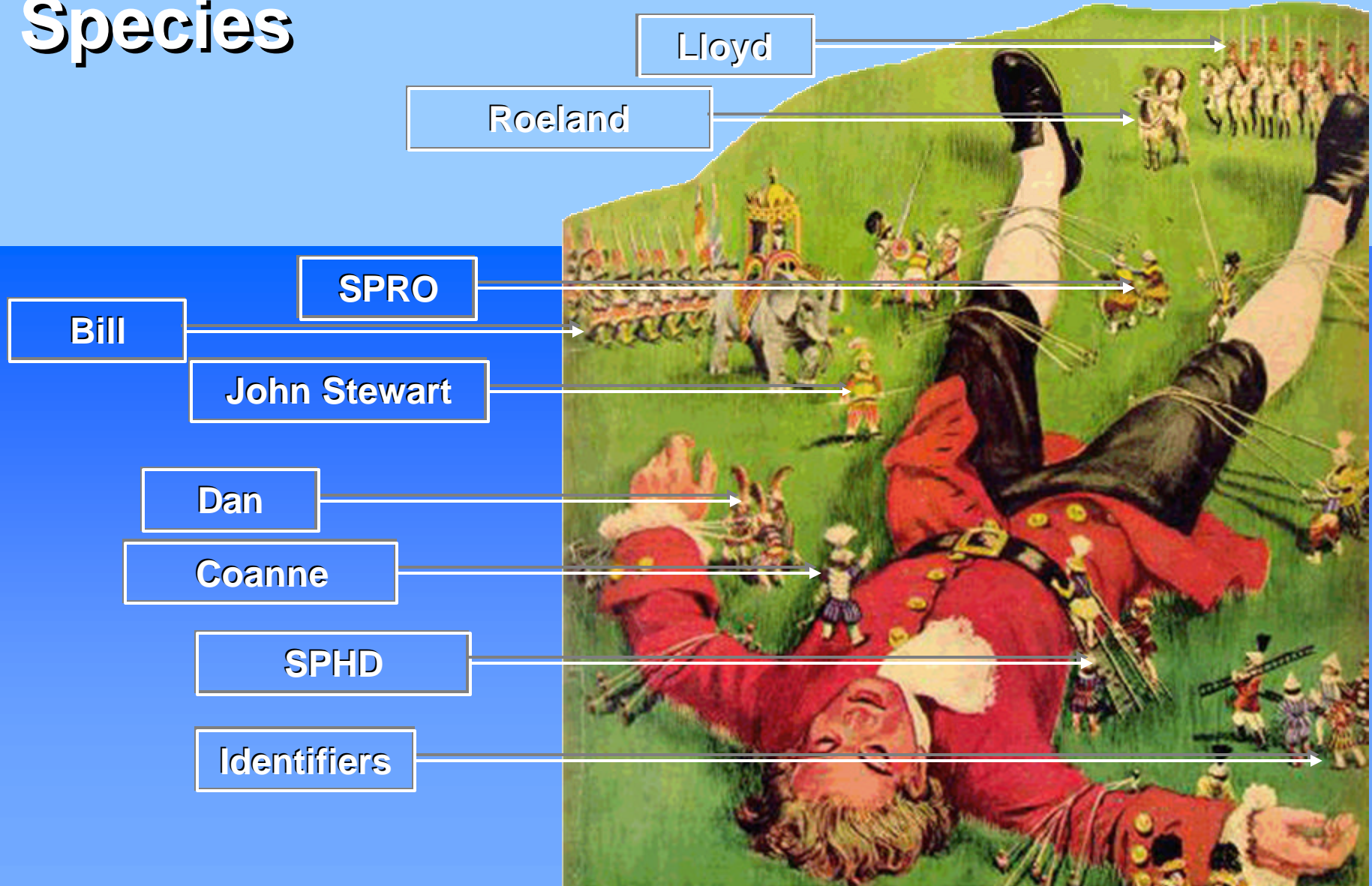
Operations

Information
Management

Science/Methods



Safeguarding Against Invasive Alien Species



Late Detection Programs



Early Detection Programs

The Survey Iceberg

Field Survey

Trapping Methods

Risk Zone Mapping

Remote Sensing

Pest Lists

Survey Protocols

GIS / GPS

Cooperative Agreements

Pest Data Sheets

Diagnostics

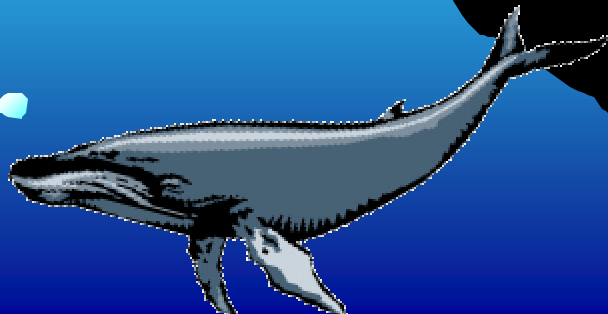
Statistics, Biology, Ecology

Reporting Tools

Risk Assessments

Data Management

Sampling



CPHST Projects: National Science Programs

- **Agricultural Quarantine Inspection (AQI) & Port Technology**
- **Biotechnology**
- **Integrated Pest Management (IPM) & Eradication**
- **Risk & Pathway Analysis**
- **Survey Detection & Identification (SDI)**



CPHST Projects Summary

| Type | Number |
|-------------------------|--------|
| CPHST Projects | 200 |
| Cooperative Agreements | 43 |
| Inter-Agency Agreements | 27 |
| Budget Line Items | 12 |

CPHST Call For Work



Incremental

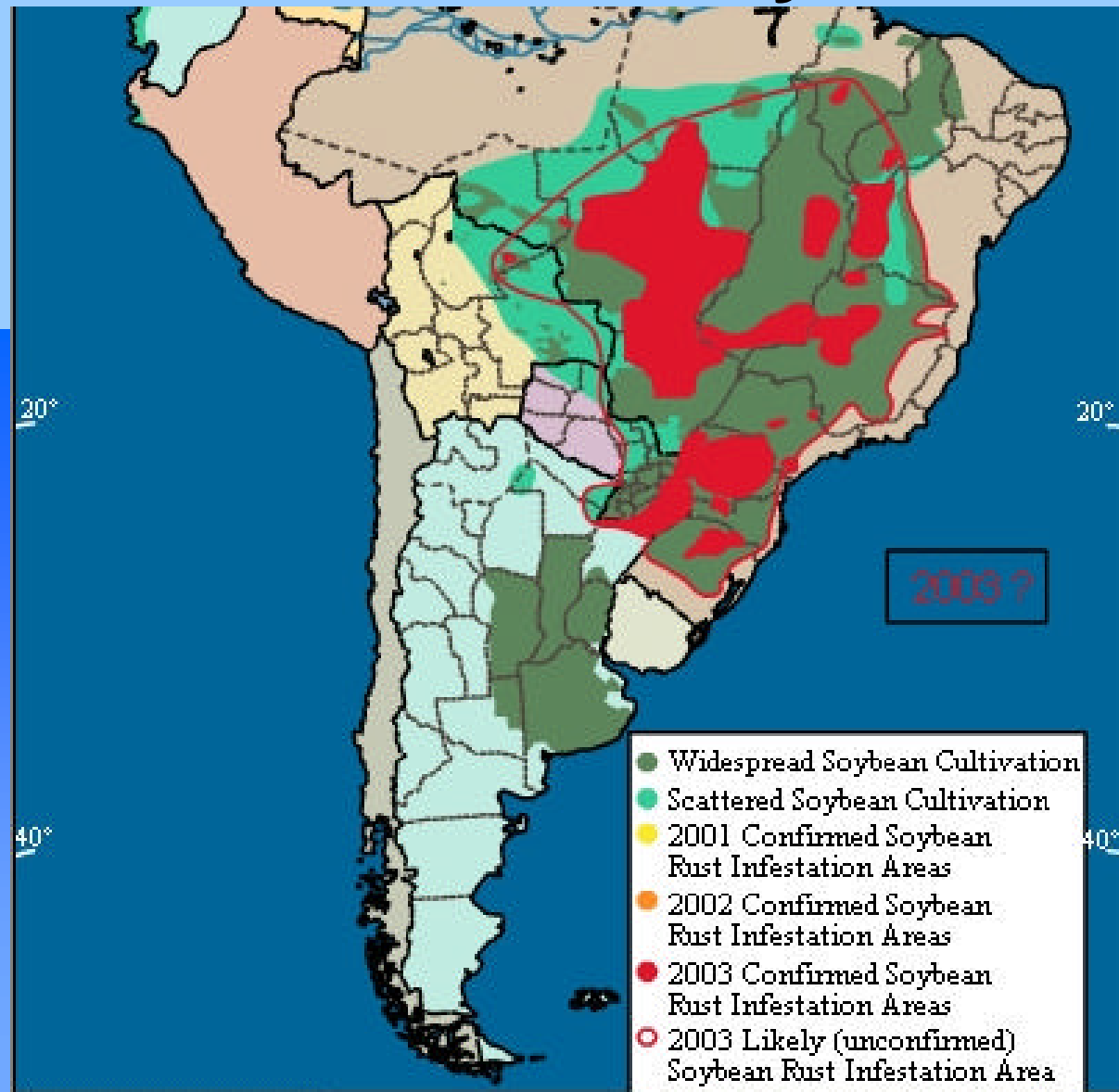


Pushing the Envelope

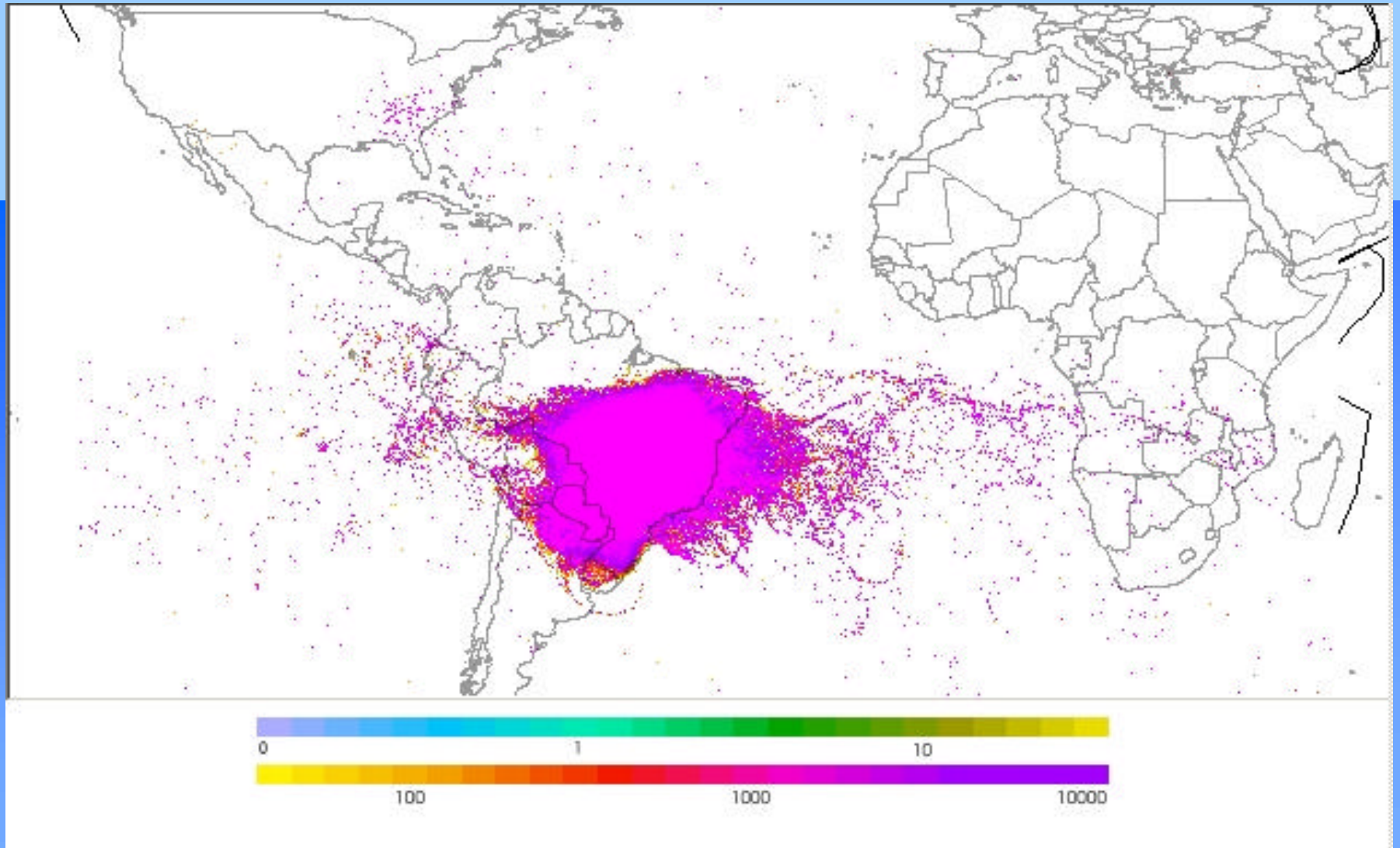


37

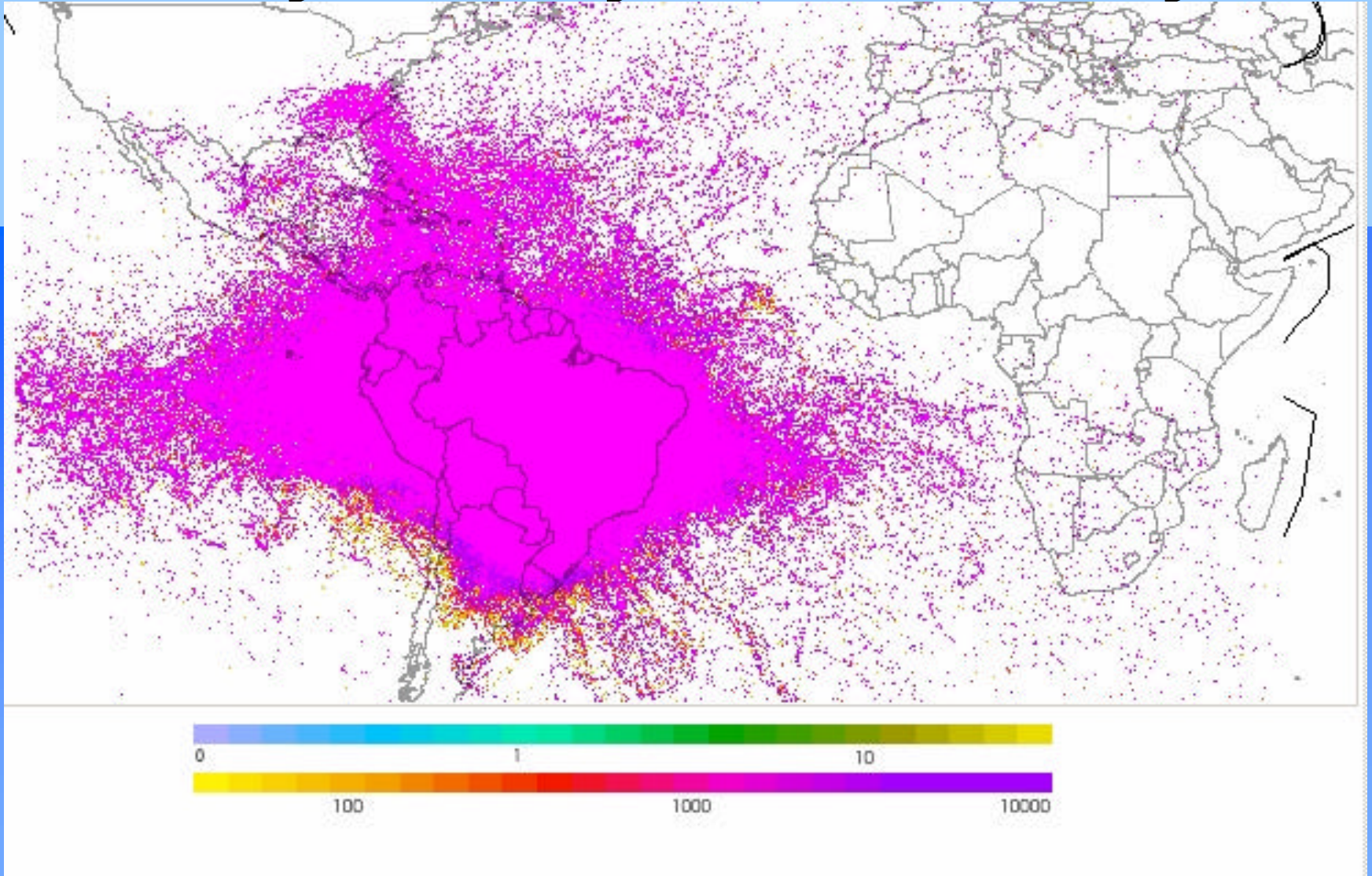
Source areas for Soybean Rust



January sum of 5 years



January to May sum of 25 years



Caribbean Basin



Mini PRA's for CAPS Target Pests

Mini Risk Assessment Grape berry moth, *Lobesia botrana* (Denis & Schiffmuller) [Lepidoptera: Tortricidae]

Robert C. Venette, Erica E. Davis, Michelle DuCosta, Holly Heisler, & Margaret Larson
Department of Entomology, University of Minnesota
St. Paul, MN 55108
September 5, 2003

Introduction

Lobesia botrana is a significant pest of berries and berry-like fruits in Europe, the Mediterranean, southern Russia, Japan, the Middle East, Near East, and northern and western Africa (Avidov and Harpaz 1969, CIE 1974). This pest is also known as the European vine moth (Zhang 1994). The likelihood and consequences of establishment by *L. botrana* have been evaluated previously in a pest-specific risk assessment (Fowler and Lakin 2002). The consequences of establishment by *L. botrana* were rated high (i.e., severe); however, the likelihood of *L. botrana* being introduced to the US was considered low (Fowler and Lakin 2002). In a separate evaluation of the pest, the chances of *L. botrana* becoming established in the US were considered high if it should be introduced (USDA 1985).

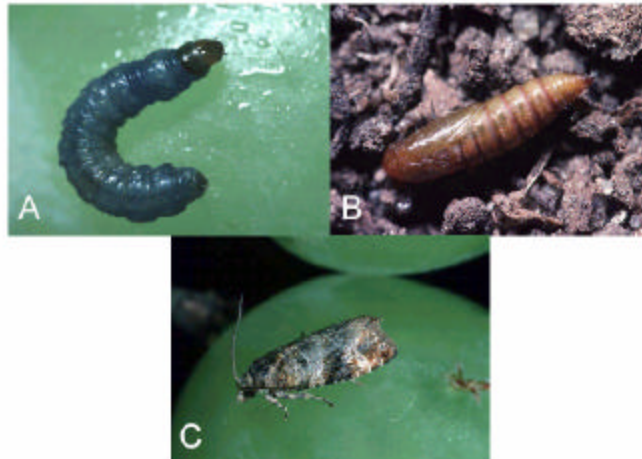
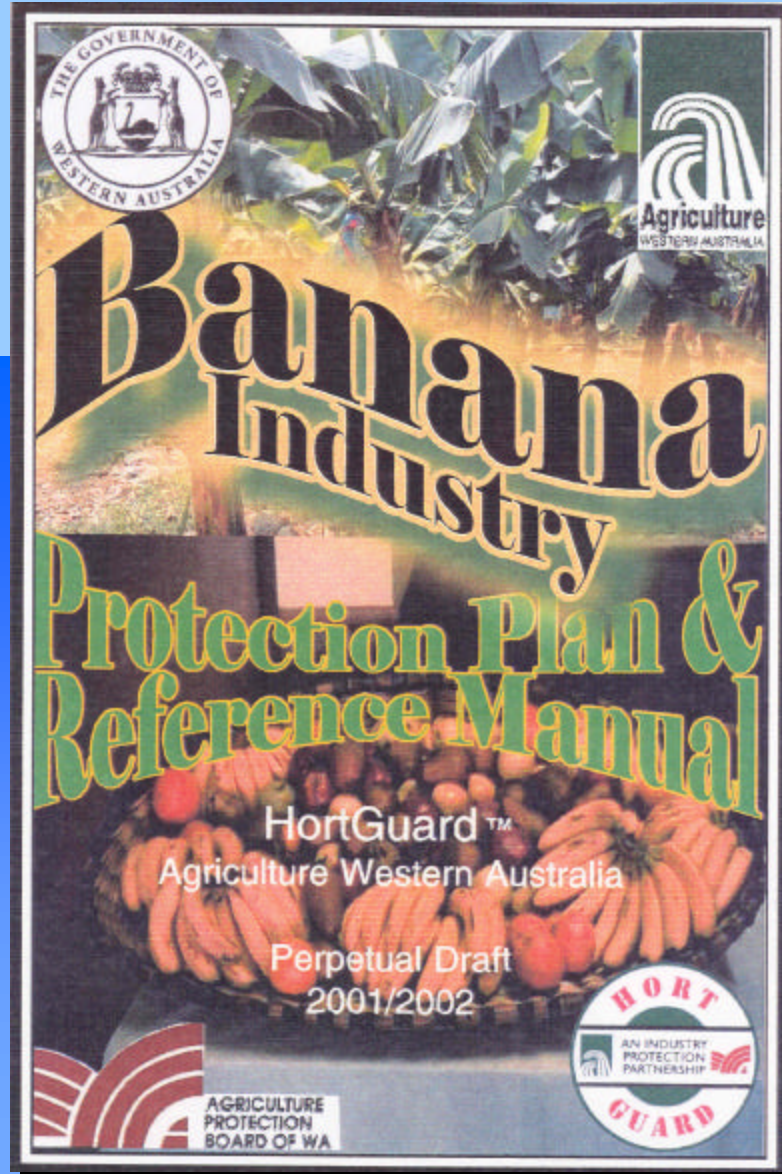


Figure 1. Life stages of *L. botrana*; (A) larva, (B) pupa, and (C) adult.
(Photos from Entopic).

Commodity Protection Manuals



Preclearance Inspection

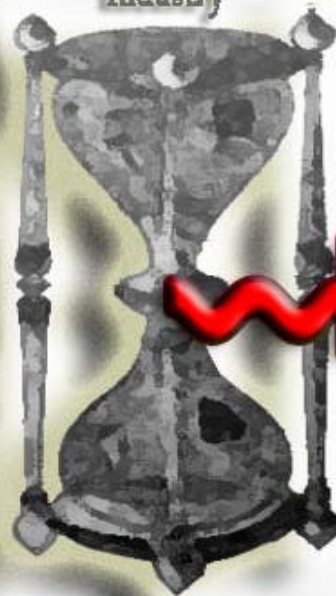
Port Inspection

Off-Shore Intelligence

Public Cooperators

Survey

Industry



ID

Pest Databases

Biocontrol/IPM

Economic Analysis

Emergency Programs

Quarantine Treatment

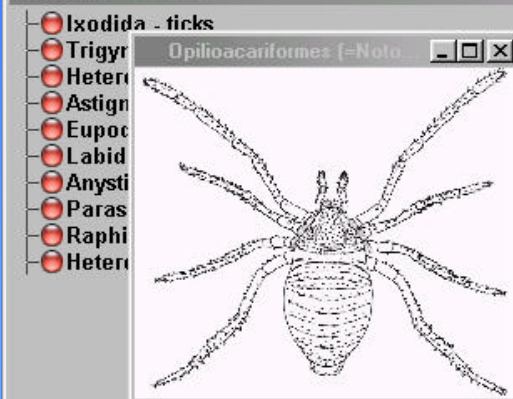
New Pest Advisory Group

Risk Assessment/Pathway Analysis



5. Cheliceral form (female)
- ☒ **robust, chelate-dentate, w/o excrescences**
 - ☐ robust, +/- teeth, with excrescences
 - ☐ serrate, 3-segmented
 - ☐ robust, chelate-lobate
 - ☐ elongate, slender, 3 segments
 - ☐ chelate-edentate or tong-like
 - ☐ shear-like, swollen
 - ☐ regressed fixed digit
 - ☐ slicing
 - ☐ hook-like
 - ☐ needle-like
 - ☐ whip-like stylettes

Taxa Discarded: 10



Character States Chosen: 1

5. Cheliceral form (female) - robust, chelate-dentate, w/o excrescences

5. Cheliceral form (female) - robust, chelate-dentate, w/o excrescences

☐ Don't skip

chelate-dentate

robust, chelate-dentate, w/o excrescences

robust, +/- teeth, with excrescences

serrate, 3-segmented

robust, chelate-lobate

elongate, slender, 3 segments

chelate-edentate or tong-like

Taxa Remaining: 31

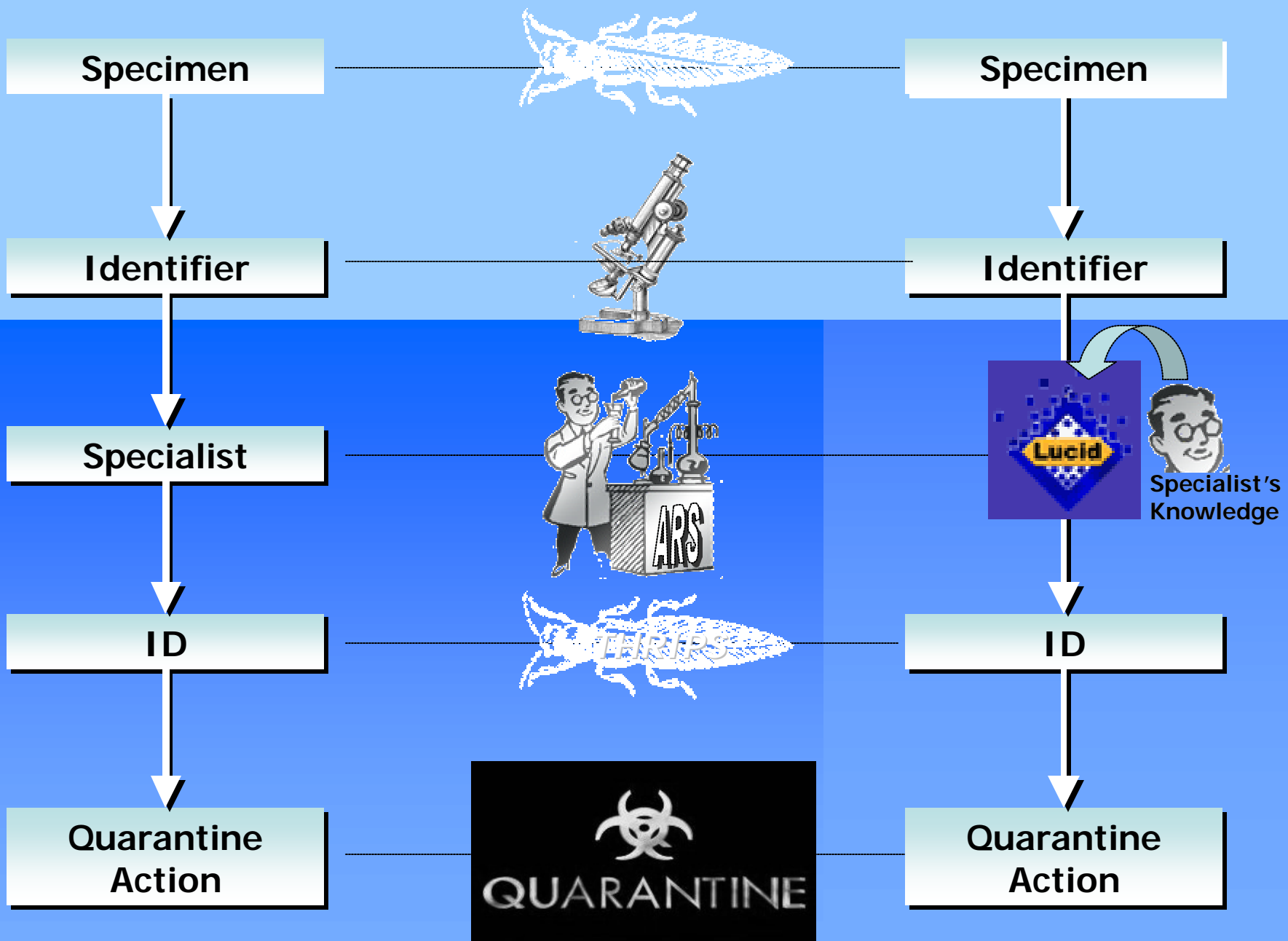
- ☒ Enarthronota - enarthronote oribatids
- ☒ Mixonomata - box mites and relatives
- ☒ Desmonomata - nothroids and relatives
- ☒ Euoribatida (Brachypylina) - oribatid, moss or beetle mites
- ☒ Oribatida larvae, nymphs

Ten Advantages of LucID

1. Focuses on what you know about a specimen
2. Taxonomist's knowledge captured in software
3. Specimen collections and literature reflected in keys
4. Common platform for all disciplines
5. Technical support

6. Increases speed and accuracy of IDs
7. Identifies specimen OR diagnoses symptom
8. Intelligent → Guides you to an end point
9. Robust → Multimedia/many features to aid ID
10. Ideal for countries lacking strong taxonomic base

Extra Credit → Not a dichotomous key





Characters Available: 39

- 1. Quick key to orders (superorders)
- 2. Shortcut to Major Groups
- 3. Capitulum (gnathosoma)
- 4. Cheliceral segments
- 5. Cheliceral form (female)
- 6. Male chelicerae
- 7. Capitular ring
- 8. Palps (pedipalps)
- 9. Median subcapitular gutter
- 10. Subcapitulum (hypostome)
- 11. Corniculus or rutellum
- 12. Tritosternum
- 13. Body articulations
- 14. Prodorsal trichobothria
- 15. Prodorsal eyes
- 16. Naso
- 17. Body armour
- 18. Body coverings

Character States Chosen: 0

Taxa Discarded: 0

Taxa Remaining: 31

- Opilioacarida - opilioacarans
- Ixodida - ticks
- Holothyrida - holothyranes
- Trigynaspida - trigynaspids
- Dermanyssina - dermanyssines
- Heterozetconina - myriapod mites
- Parasitina - parasitines
- Arctacarina - Arctacarus
- Zerconina - zerconoids
- Epicriina - epicriids
- Heatherellidae - Heatherella
- Sejina - sejine mesostigmatans
- Microgyniina - microsejines
- Uropodina - turtle and tortoise mites
- Palaeosomata - primitive oribatids
- Parhyposomata - parhypochthonoids
- Enarthronota - enarthronote oribatids
- Mixonomata - box mites and relatives

Lucid - Mites in Soil - Orders, Suborders & Cohorts

Key

Characters

Taxa

Windows

Help

Characters Available: 39

- 5. Cheliceral form (female)
 - robust, chelate-dentate, w/o excrescences
 - robust, +/- teeth, with excrescences
 - serrate, 3-segmented
 - robust, chelate-lobate
 - elongate, slender, 3 segments
 - chelate-edentate or tong-like
 - shear-like, swollen
 - regressed fixed digit
 - slicing**
 - hook-like
 - needle-like
 - whip-like stylettes
 - internal, obscure
 - vestigial or seemingly absent
- 25. Female genital shields (form)
- 10. Subcapitulum (hypostome)
- 23. Female sternal shield

Character States Chosen: 2

- 3. Capitulum (gnathosoma): hidden under projecting prodorsum
- 5. Cheliceral form (female): slicing

Taxa Discarded: 29

- Opilioacarida - opilioacarans
- Holothyrida - holothyran
- Trigynaspida - trigynaspids
- Dermanyssina - dermanyssines
- Heterozetconina - myriapod mites
- Parasitina - parasitines
- Arctacarina - Arctacarus
- Zerconina - zerconoids
- Epicriina - epicriids
- Heatherellidae - Heatherella
- Sejina - sejine mesostigmatans
- Microgyniina - microsejines
- Uropodina - turtle and tortoise mites
- Palaeosomata - primitive oribatids
- Parhyposomata - parhypochthonoids
- Enarthronota - enarthronote oribatids
- Mixonomata - box mites and relatives
- Desmonomata - nothroids and relatives

Taxa Remaining: 2

- Ixodida - ticks**
- Raphignathina - spider mites, raphignathoids, chelytids

All

5. Cheliceral form (female): slicing





AQUARIUM AND POND PLANTS OF THE WORLD

by Shaun L. Winterton

- Introduction
- Identify an aquatic plant
- Terrestrial plants in aquaria
- Federal Noxious Weeds
- Browse fact sheets



United States Department
of Agriculture



Animal and Plant
Health Inspection
Service

NC STATE UNIVERSITY



Characters Available: 51

Character States Chosen: 0

- Plant form
- Plant type

Plant form - free-floating on or just below water surface



Don't skip



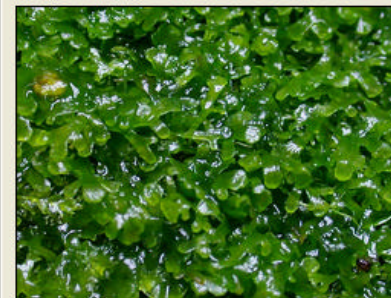
free-floating on or just below water surface...



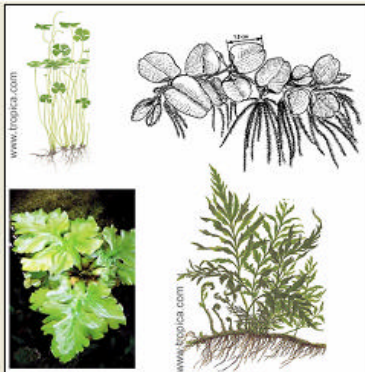
leaves floating, basal rosette attached...



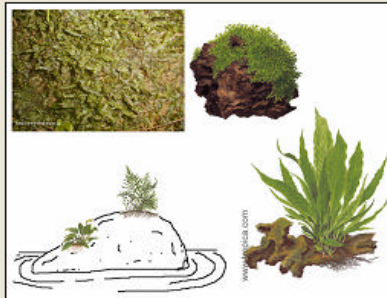
submerged stem plant, floating apical rosette...



creeping thallus...



creeping fern rhizome...



epiphyte...



creeping stolon, rooted at nodes, leaves elongate...



creeping stem plant...

Taxa Remaining: 125

- Cardamine
- Carex
- Ceratophyllum
- Ceratopteris
- Chara
- Colocasia
- Crassula
- Crinum
- Cryptocoryne
- Cyperus

Opening Page

General Information

Bibliography

Character Pages

Distribution

Host Records

Material Examined

Species List &
Synonymy

Morphology Pages

- Head
- Thorax
- Abdomen
- Legs
- Wing

An interactive identification key to the species of the *Bactrocera (Bactrocera) dorsalis* complex of Fruit Flies





ThripsID

Pest thrips of the world

An introduction to the identification and classification of pest thrips of the world

Gerald Moritz *, David Morris † & Laurence Mound †,‡

*Institut für Zoologie der Universität, Domplatz 4, D-06099 Halle, Germany.

†CSIRO Entomology, GPO Box 1700, Canberra, Australia.

‡School of Biological Sciences, Flinders University, Adelaide, Australia.





Plant Parasitic Nematodes (Temperate)

<http://www.lucidcentral.com/keys/nematodes/Default.htm>



Plant Pathogenic Fungi (Temperate regions)

http://plant-protection.massey.ac.nz/resources/software/lucid_key.htm



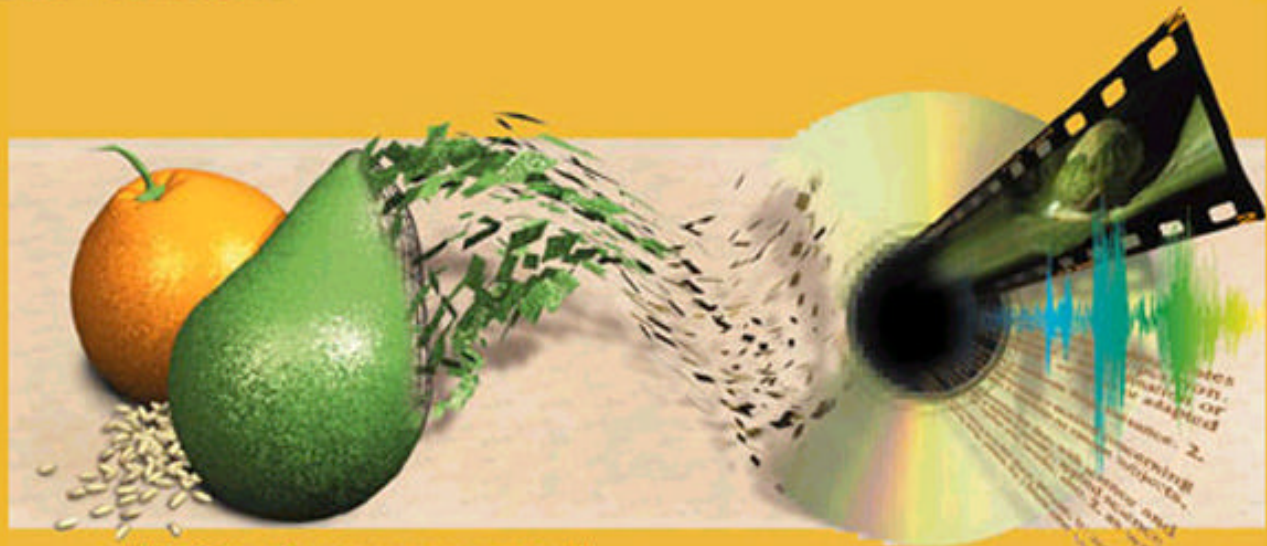
Centre for Biological Information Technology

University of Queensland, Australia



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CBIT Home



"Getting the message across"

LucID Resources On-Line

www.lucidcentral.com

www.cbit.uq.edu.au

For More Information:

Write to:

Centre for Biological Information Technology
Level 6, Hartley Teakle Building
The University of Queensland
Queensland, 4072
AUSTRALIA

OR

Phone: +61 (0)7 3365 1851

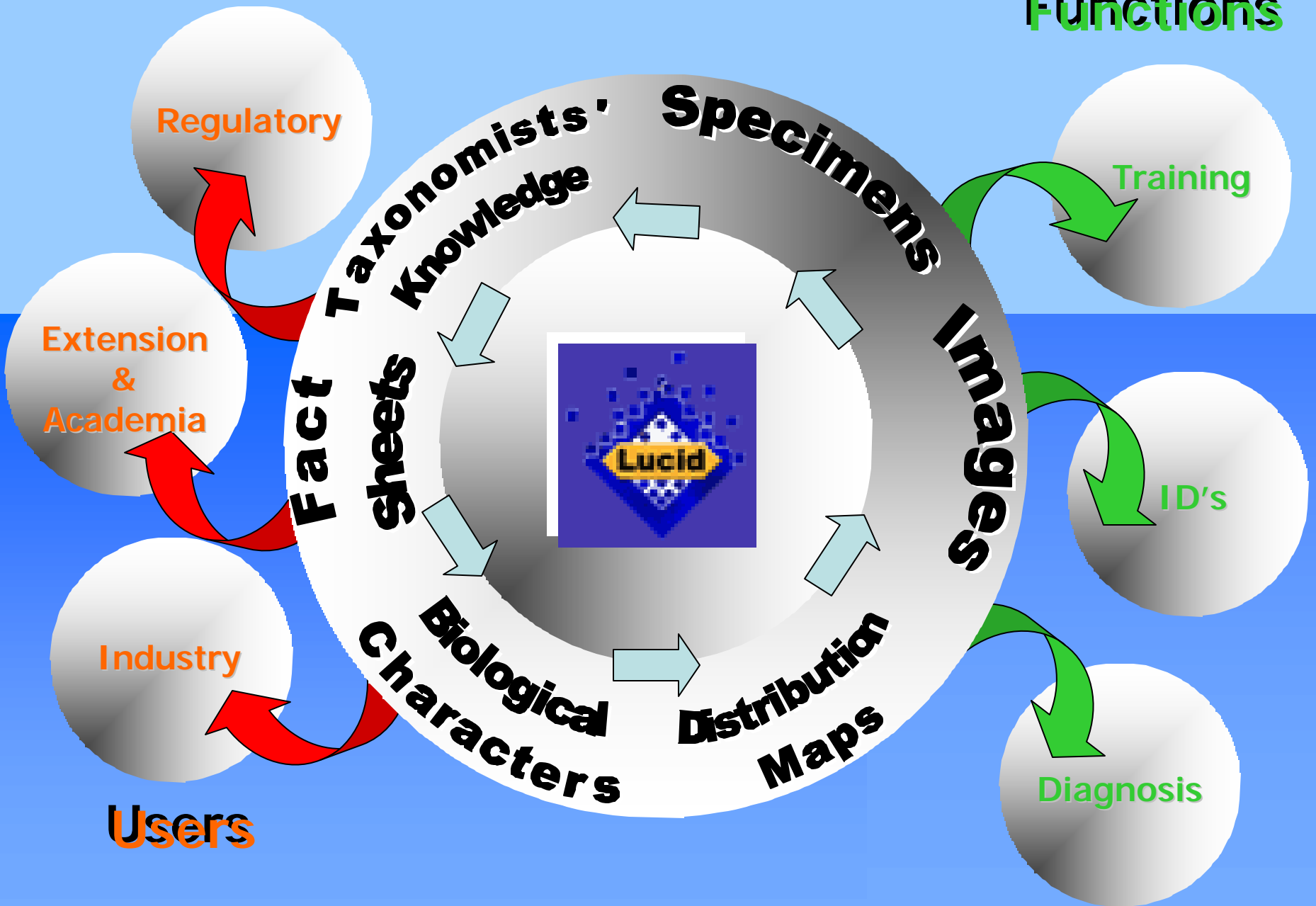
Fax: +61 (0)7 3365 1855

Email: enquires@cbit.uq.edu.au

LucID Registration for APHIS Stakeholders

- Rob Quartarone
 - (602) 437-1492 ext. 223
 - 3645 E. Weir Avenue, Phoenix AZ, 85040
 - Robert.Quartarone@aphis.usda.gov

Functions



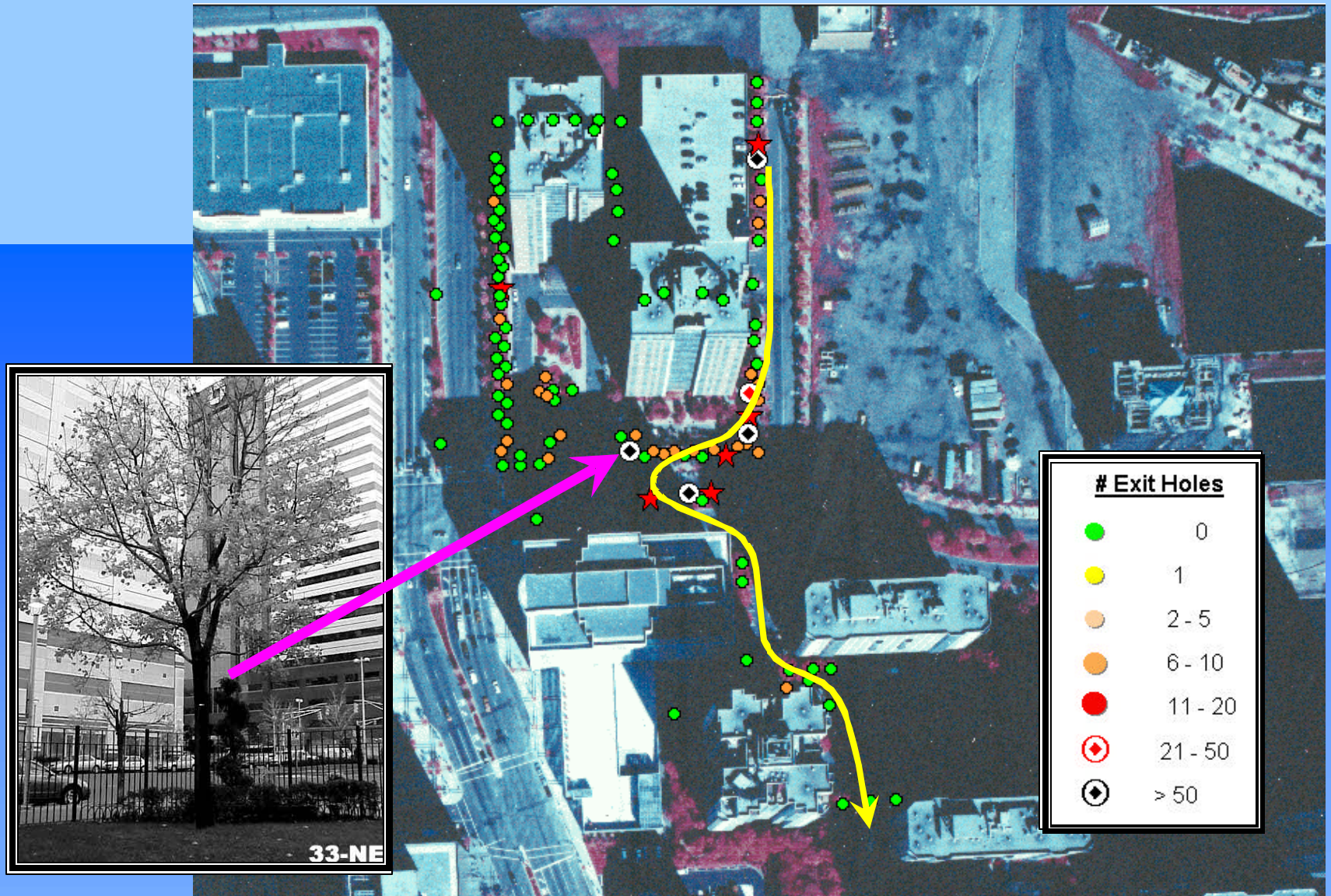
Asian Longhorned Beetle



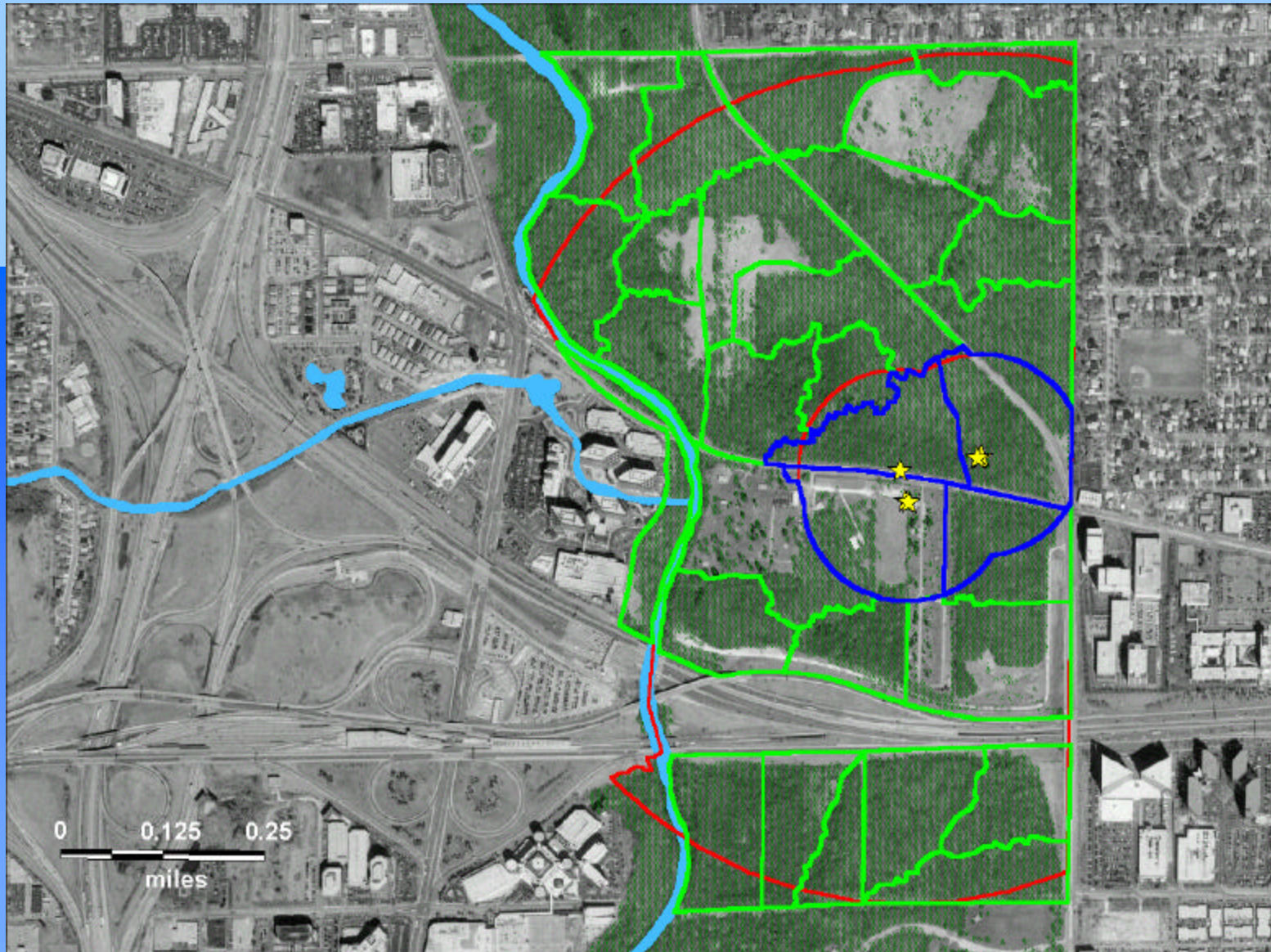
GIS Applied to Setting ALB Survey Boundaries



Aerial IR Imagery, GPS, GIS and Ground Truth Data Used in an ALB Population Study in Jersey City



Aerial Imagery, GPS and GIS Used to Design an ALB Survey for a Chicago Forest Preserve



Hyperspectral Imagery and Emerald Ash Borer Survey



Hyperspectral Imagery and Emerald Ash Borer Survey

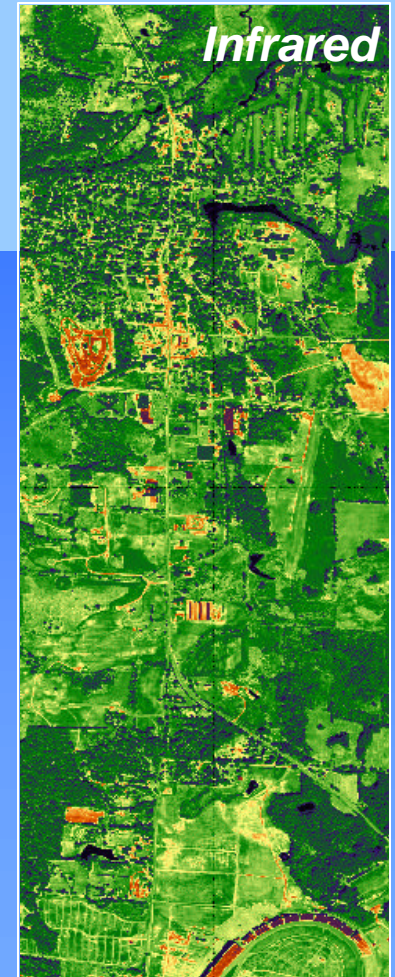
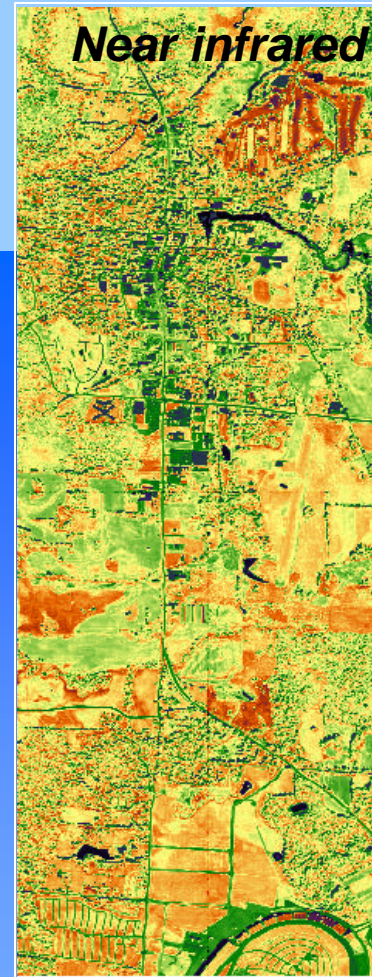
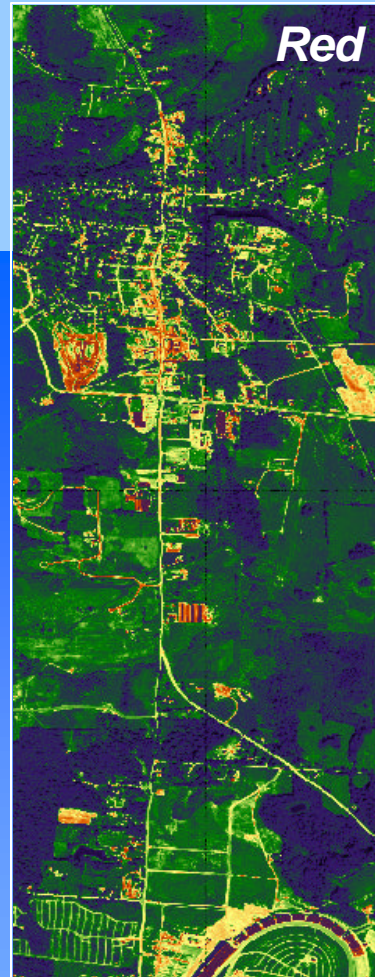
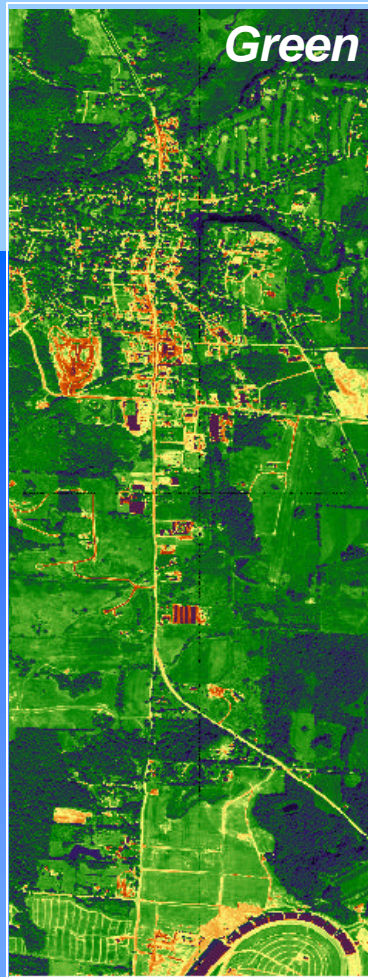
Pilot project in Brooklyn, Michigan—September 2003



Probe 1 sensor

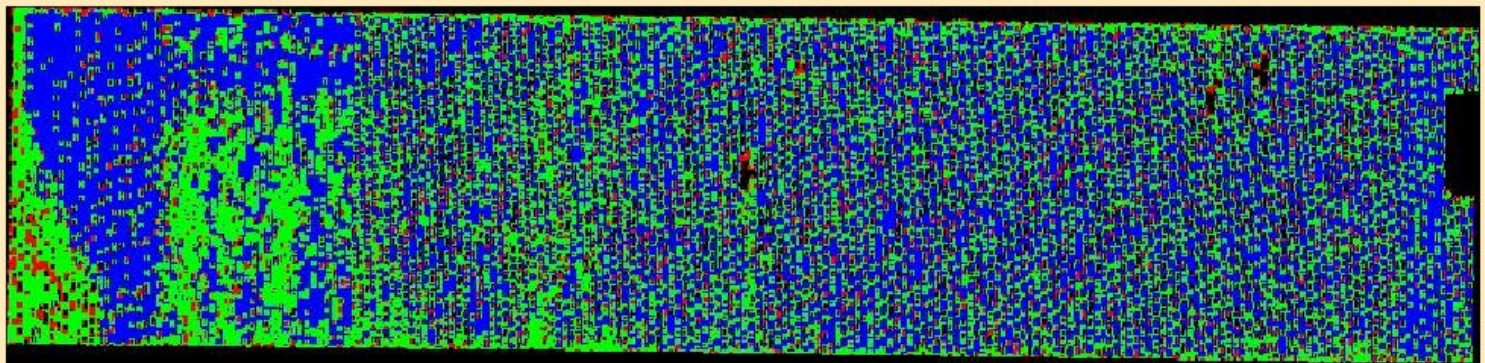
Hyperspectral Imagery and Emerald Ash Borer Survey

Pilot project in Brooklyn, Michigan—September 2003



Combinations of 128 spectral bands will be used to construct maps showing healthy and infested ash trees.

Image Analysis



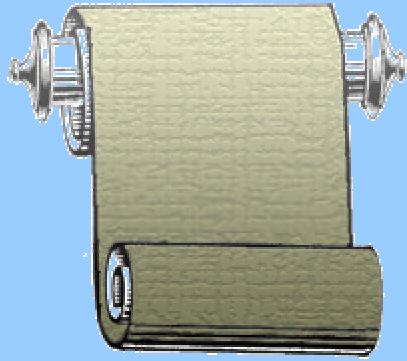
Pierce's Disease

C37_vinemap

- Positive
- Negative
- No Data

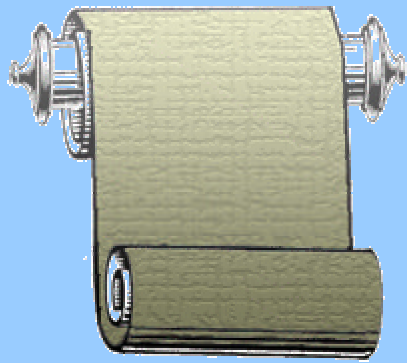


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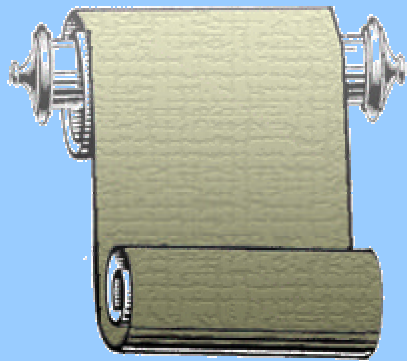
Society 'Least Wanted' Pest Lists

- **Acarological Society of America**
- **American Malacological Society**
- **American Phytopathological Society**
- **Entomological Society of America**
- **Society of Nematologists**
- **Weed Science Society of America**

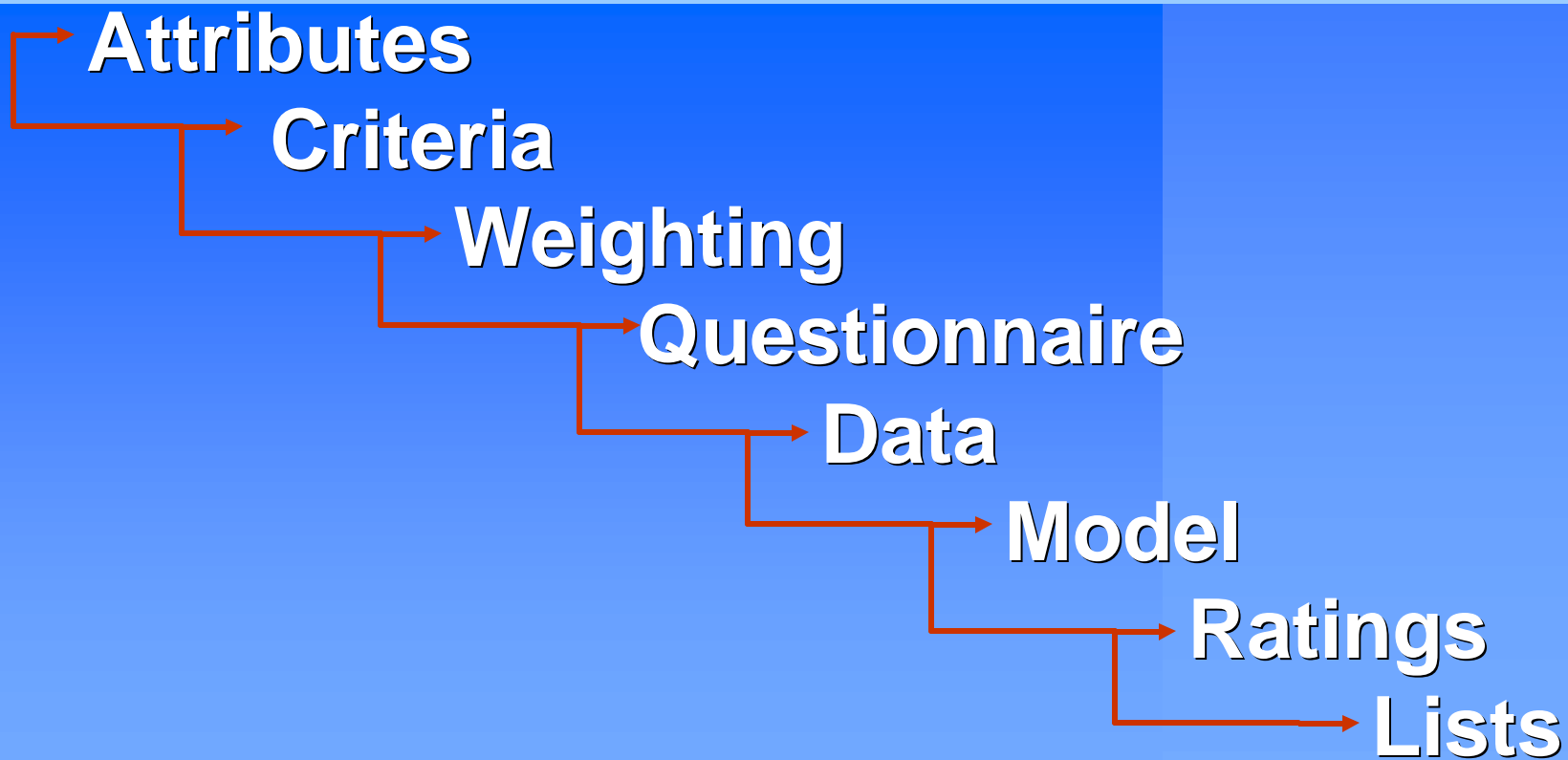


Why Create Pest Lists?

- **Focus detection and survey efforts**
- **Identify exclusion priorities**
- **Agricultural Quarantine Inspection (AQI)**
- **Tap into outside expertise**
- **Risk Assessment**
- **Training**
- **Regulations and Permits**
- **Invasive Species Mgmt Plan**



The Process



Summary

Continuing need for:

- **Biological information to support detection**
- **Survey methodologies and protocols**
- **Diagnostic tools, e.g. LUCID**
- **Novel technologies adapted for plant protection**
- **International information sharing**

